HP SureStore E Disk Array XP256 Familiarization Guide

Notice

Warranty

If you have any questions about the warranty for this product, contact your dealer or local Hewlett-Packard sales representative.

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Safety Instructions

Service
Any servicing, adjustment, maintenance, or repair must be performed only by authorized service-trained personnel.

Warning	**Denots a hazard that can cause personal injury or death.**
Caution	Denotes a hazard that can cause hardware or software damage.

Format Conventions

keyword	Specifies text to be typed exactly as shown, such as commands, path names, file names, and directory names.
variable	Indicates that you must supply a value.
output	Denotes text displayed on the screen.
[ ]	Indicates that the enclosed element is optional and may be left out.
{ }	Indicates that you must specify one of the listed options.
|	Separates alternatives.
. . .	Indicates a repetition of the preceding parameter.

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Acronyms and Abbreviations

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What's new in this revision?

Date	Description
September 15, 1999	Open-8 emulation added.
January 15, 2000	Added Auto LUN and Asynchronous Continuous Access
July 27, 2000	Modified instructions for power-failure recovery

Updates

For the most current XP documentation and announcements, see the HP web site:

www.hp.com

You can search this web site for the keyword **XP256**.

1   DISK ARRAY DESCRIPTION

Features

Physical Components

Monitoring and Reporting

Optional Software

Disk Array Features

The HP SureStore E Disk Array XP256 provides high-capacity, high-speed mass storage, with continuous data availability, ease of service, scalability, and connectivity.
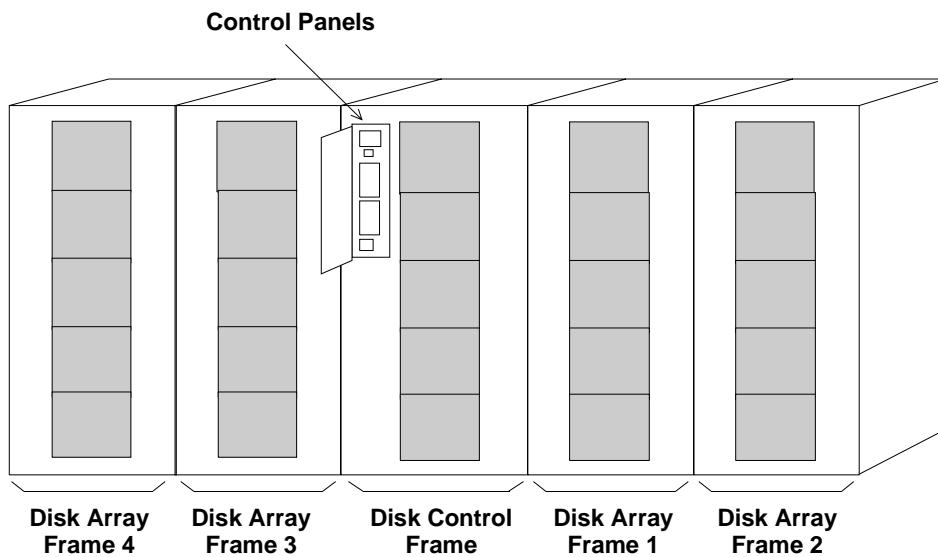
Figure 1   Disk Array

The disk array can be attached to multiple open-system environments such as HP-UX, Windows NT, Solaris, AIX, and so on. The disk array is designed to handle very large databases, data warehousing applications, and data mining applications.

This disk array can have up to 32 SCSI ports. It also supports Fibre Channel connections with data transfer rates of up to 100 MB/second. Each Fibre Channel native supports up to 16 Fibre Channel ports. This makes the disk array ideal for clustered configurations of open-system servers.

Continuous Data Availability

The disk array is the first RAID disk array to provide truly continuous data availability. It is designed for nonstop operation and continuous access to all user data.

The disk array has no single point of component failure. It is not expected to fail in any way that would interrupt user access to data.

The disk array has component and function redundancy, providing full fault-tolerance for disk array microprocessors, control storage, control and data buses, power supplies, and cooling fans. The disk array can sustain multiple component failures and still continue to provide full access to stored data.

While access to user data is never compromised, the failure of a key component can degrade disk array performance.

Nondisruptive Service and Upgrades

Monitoring software detects failed disk drives and notifies the HP support center automatically so a service representative can replace the disk drive.

All hardware subassemblies can be removed, serviced, repaired, or replaced non-disruptively during disk array operation. All microcode upgrades can be performed during normal disk array operations, using the array's built-in service processor (SVP) or the facilities of the host. Alternate pathing can be achieved by host fail-over software and/or alternate SCSI paths. The disk array provides up to 32 SCSI ports to accommodate alternate pathing for host attachments.

Connectivity

SCSI Connectivity. The disk array can be configured with up to four pairs of Ultra-SCSI four-port adapters for a total of 32 ports. Each adapter provides four concurrent data transfers at rates up 40 MB/sec, for a total data transfer rate of 160 MB/sec. Each SCSI port can support up to 15 SCSI target IDs (TIDs), and each SCSI TID can address eight logical units (LUNs), for a total of 120 LUNs per SCSI port.

Fibre Channel Connectivity. A disk array can be configured with a maximum of four channel adapters which can support 16 Fibre Channel ports. Each port is assigned a unique TID and can support eight LUNs. The disk array can support up to 128 LUNs attached through Fibre Channel. Fibre Channel provides data transfer rates up to 100 MB/sec. The disk array can support Fibre Channel arbitrated loop (FC-AL) and Fabric Fibre Channel topologies.

Scalability

The nonvolatile cache can also be configured from 4 GB to 16 GB in 1 GB increments.

The disk array's storage capacity can be increased from 17 GB to a maximum of 9.0 TB. Disk drive and cache upgrades can be performed without interrupting user access to data and with minimal impact on disk array performance.

Physical Components

The disk array consists of the following major hardware components:

- one disk control frame

  The controller cabinet contains the control panel, Fibre Channel connection hardware, SCSI connection hardware, the service processor, and control components for the disk array.

- one to four disk array frames

  These cabinets contain the disk drives.

- one service processor (SVP)

  The SVP is an internally-mounted laptop computer used for maintenance. It is located in the controller cabinet. The SVP is used by an HP service representative.

- one optional remote console PC

  The remote console PC is attached to the disk array by an internal local area network (LAN). The remote console PC runs applications that monitor and manage disk array operations.
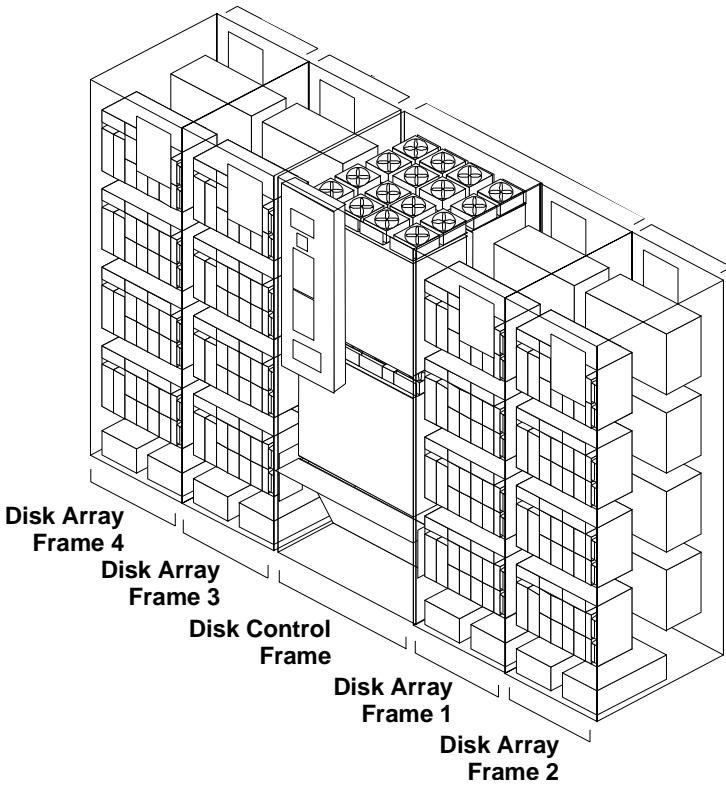
Figure 2   Disk Array Components

Disk Control Frame

The key features and components of the disk control frame are redundant controllers and redundant power supplies. There is no active single point of failure. All control frame components can be repaired or replaced without interrupting access to user data.

Disk Array Frame

The disk array frames contain the physical disk drives, including the disk groups and the dynamic spare disk drives. The disk array can be configured with up to four disk cabinets to provide a maximum storage capacity of 9.0 TB.

One disk array frame is required. The second, third, and fourth frames are optional. The first and second disk array frames are attached to the right side of the control frame. The third and fourth are attached to the left side of the control frame.

The disk array uses 3.5-inch disk drives, with a variety of available capacity points. Ask your HP service representative about currently available disk drives.

Disk drives can be replaced without disrupting user activity.

The disk array uses diagnostic and dynamic scrubbing techniques that detect and correct disk errors.

For both RAID-5 and RAID-1 array groups, any spare disk drive can back up any other disk drive of the same capacity, anywhere in the disk array, even if the failed disk and the spare disk are in different array domains.

The disk array can be configured with a minimum of one and a maximum of 16 spare disk drives.

Service Processor (SVP)

The disk array comes with a built-in, laptop-style PC called the service processor (SVP). The SVP is integrated into the control frame and is used only by an HP service representative.

The SVP is used to configure, maintain, and upgrade the disk array. The SVP also collects performance data for key components of the disk array for diagnostic testing and analysis.

The SVP does not have access to any user data stored on the disk array.

Remote Console PC

The remote console PC runs a main remote control application and other standard and optional software to manage and monitor the disk array.

The remote console PC is connected to one or more disk arrays (up to 8) using a special LAN.

The specific hardware requirements for the remote console PC (processor speed, storage capacity, memory) will vary depending on the optional software to be used and the number of disk arrays to be attached.

The Remote Control software for the remote console PC does not have access to any user data stored on the disk array.

Monitoring and Reporting

The disk array has a maintenance support application which monitors the operation of the disk array at all times, collects hardware status and error data, and transmits this data through a modem to the HP support center.

The support center analyzes the data and implements corrective action, if necessary. In the unlikely event of a component failure, the maintenance support application calls the support center immediately to report the failure. This automatic error/failure detection and reporting does not require any action on the part of the user.

In this way most disk array problems can be identified and fixed prior to actual failure. With the redundancy features of the disk array, it will remain operational even if one or more components fail.

The maintenance support application requires a dedicated telephone line.

The maintenance support application does not have access to any user data stored on the disk array.

Optional Software

HP provides a number of optional software applications to increase data accessibility and enable continuous user data access.

HP SureStore E Performance Manager XP

HP SureStore E Performance Manager XP (PMXP) is an optional performance and usage monitoring application for the disk array. PMXP runs on the remote console PC and can monitor as many as eight disk arrays on the disk array internal LAN.

PMXP monitors hardware performance, cache statistics, and I/O statistics of the attached disk arrays and displays real-time and historical data as graphs.

HP SureStore E Remote Control XP

HP SureStore E Remote Control XP is an optional software application that runs on the remote console PC. It has a primary function of reporting Remote System Information Messages (R-SIMs). In addition, it is the base software that allows a number of additional optional packages to run. Those packages include the following:

- **HP SureStore E LUN Configuration Manager XP**

  The HP SureStore E LUN Configuration Manager XP allows open-system users to define SCSI paths, define the SCSI/FC-to-logical device (LDEV) mapping for all LUNs, and configure arbitrated-loop and fabric FC topologies. It also allows users to create "expanded-size" LUNs, permitting host access to the data on the disk array using fewer logical units.

- **SNMP**

  The Microsoft simple network management protocol (SNMP) is a part of the TCP/IP protocol suite that supports maintenance functions for the disk arrays. SNMP transfers management information and R-SIMs between the SNMP manager (on the open-system server) and the SNMP agent (on the remote console PC). The SNMP agent performs error reporting operations requested by the SNMP manager, for up to eight disk array models.

- **HP SureStore E Cache LUN XP**

    This application allows users to place data in and remove data from cache to improve disk array performance when the system accesses frequently used data.

    HP SureStore E Cache LUN XP enables users to store specific high-usage data in cache memory. Cache-resident data is available at host data transfer speeds for both read and write operations. HP SureStore E Cache LUN XP can be used in conjunction with custom volume size (CVS) to provide even higher data access performance than when either of these features is used individually.

- **Custom Volume Size (CVS)**

    Custom volume size (CVS), allows the user to configure custom-size volumes (CVs) which are smaller than normal volumes. CVS improves data access performance by reducing logical device contention, as well as host I/O queue times, which can occur when several frequently accessed files are located on the same volume.

- **HP SureStore E Secure Manager XP**

    This software is for LUN security on the array. The applications allows the assignment of selected LUNs to selected hosts. It hides LUNs from hosts not associated with the LUNs. HP SureStore E Secure Manager XP is executed from the remote console PC.

- **HP SureStore E Auto LUN XP**

    Auto LUN enables the optimization of data storage and retrieval on the disk array. Auto LUN monitors and provides detailed information on the physical disk drive usage of the disk array and enables you to optimize the logical volume allocation and RAID level configuration (RAID-1, RAID-5) of the disk array.

HP SureStore E Continuous Access XP

HP SureStore E Continuous Access XP enables users to copy data between disk arrays as far as 1600 km (1000 miles) apart. HP SureStore E Continuous Access XP provides synchronous and semi-synchronous copy modes and can be used for data backup, disaster recovery planning, and/or data duplication. For further detail see *HP SureStore E Continuous Access XP: User's Guide.*

The primary LUNs are available for read and write operations during all normal remote copy operations.

HP SureStore E Business Copy XP

HP SureStore E Business Copy XP provides a quick and easy way to create an internal copy of a volume for a wide variety of purposes, such as application testing, offline backup, and Euro-currency conversion testing. When used in conjunction with HP SureStore E Continuous Access XP, HP SureStore E Business Copy XP allows users to maintain up to multiple copies of critical data.

HP SureStore E Data Exchange XP

HP SureStore E Data Exchange XP (DE) is an optional feature of the HP SureStore E Disk Array XP256. It enables data stored on a multiplatform disk array to be converted and transferred between mainframe-based files and open-system files.

HP SureStore E Resource Manager XP

The HP SureStore E Resource Manager XP application allows mainframe data and open-system data to coexist in the same disk array. This reduces and optimizes storage maintenance and management overhead.

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┌──────────────┐                            ┌──────────────┐
│              │                            │    UNIX      │
│    MVS       │                            │              │
│              │                            │  Windows NT  │
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  ESCON or          ╱ ╲          ╱ ╲          SCSI or
   Metal           │Main-│      │Open │       Fibre Channel
                   │frame│      │Volume│
                   │Volume│     ╲   ╱
                    ╲   ╱        ╲ ╱
                   Disk Array
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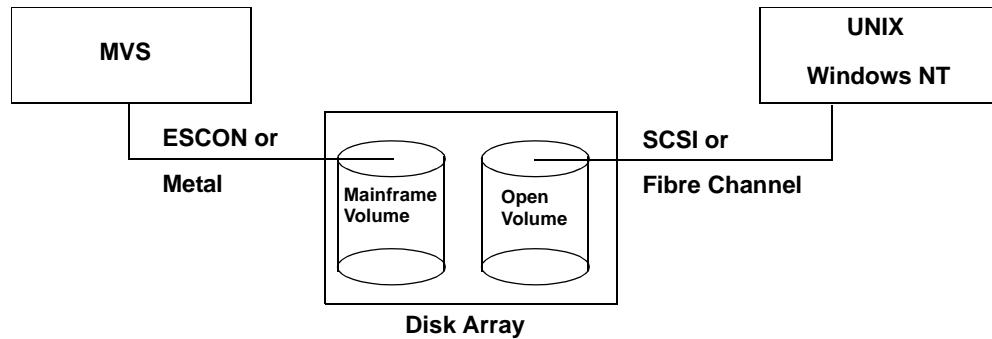
HP SureStore E RAID Manager XP

This application is the host-based component of the HP SureStore E Business Copy XP and HP SureStore E Continuous Access XP applications. It gives the system administrator command line control over these programs. It is also used by HP SureStore E Continuous Access XP for local and remote host communication.

2 OPERATION

Safety Precautions

Operator Control Panel

Power Switch Panel and Circuit Breakers

Emergency Power-Off

Normal Operation

Powering Down the Disk Array

Recovering from a Power Outage to the Disk Array

Using Remote Control Software

Operation

Safety Precautions

Observe the following safety precautions while operating the disk array:

- Keep the front and rear doors closed at all times. Do not open the doors for any reason except to access the emergency power-off switch.

- Before powering off the disk array, make sure it is not undergoing any remote maintenance.

- Keep the tops and sides of the cabinets clear to allow air to flow properly.

- Do not perform any procedures not described in this document. If you have any questions or concerns, please contact your HP service representative.

WARNING   **Do not touch areas marked HAZARDOUS, even with the power off. These areas contain high-voltage power.**

Operator Control Panel

Once the disk array is powered up and running normally, power-failure recovery is the only user intervention required at the power switch panel. However, it is important to be aware of the meanings of the panel's status LEDs, the location of the emergency power-off switch, and the location of the circuit breakers Service information messages (SIMs) are reported to the HP support center, the disk array's internal service processor (SVP), and to the user's remote console.

The control panel is located on the front of the control cabinet. Figure 3 illustrates the control panel. The item numbers in the figure correspond to the item numbers in Table 1.
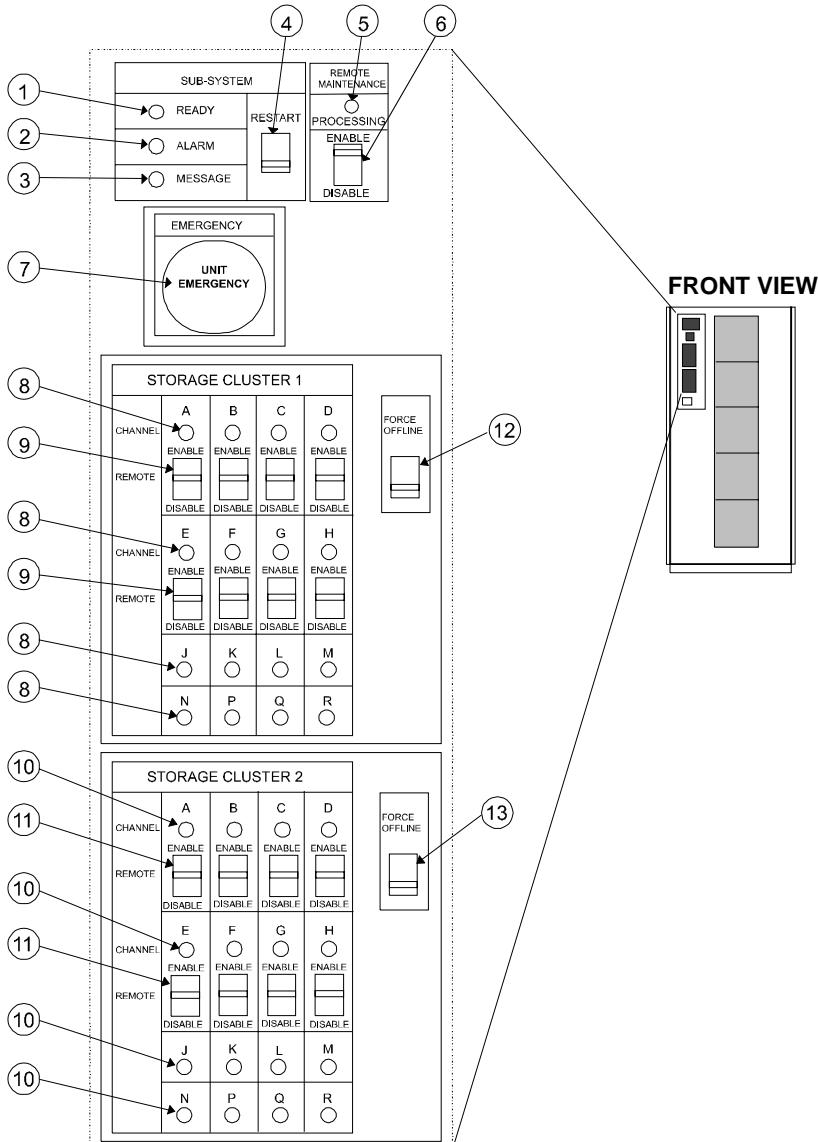
Figure 3   Operator Control Panel

Table 1   Operator Control Panel Indicators and Controls

Item	Name	Description	Function
1	SUBSYSTEM READY	Green LED	Indicates the disk array is ready for operation.
2	SUBSYSTEM ALARM	Red LED	Indicates low DC voltage, high DC current, high temperature, or an unrecoverable failure has occurred. Applies to both storage clusters. (Storage clusters consist of two redundant controller halves. Each storage cluster contains all physical and logical elements (for example: power supplies, CHIPs, ACPs, cache, and control storage) needed to sustain processing within the disk array.)
3	SUBSYSTEM MESSAGE	Amber LED	Indicates a SIM has been generated. This indicator can be reset only by an HP service representative.
4	SUBSYSTEM RESTART	Switch	Used to unfence a fenced drive path and release the write inhibit command. Applies to both storage clusters. This switch is not used on the open-system model.
5	REMOTE MAINTENANCE PROCESSING	Amber LED	Applies to both storage clusters. Lit: indicates remote maintenance is possible if authorized and installed. Blinking: indicates a remote maintenance activity is in progress.
6	REMOTE MAINTENANCE ENABLE/DISABLE	2-Way switch	Enables and disables remote maintenance, if installed. Applies to both storage clusters.

(continued)

Operation

Table 1   Operator Control Panel Indicators and Controls *(continued)*

Item	Name	Description	Function
7	EMERGENCY POWER-OFF (EPO)	1-Way locking switch	For emergency use only. Shuts down power to the entire disk array. Once pulled, this switch locks into position and must be reset by an HP service representative.
8	STORAGE CLUSTER 1, CHANNEL A–H ENABLE	Green LED	**ON** indicates the cable and terminator are properly connected to the port and the path to the host is ready and enabled. **OFF** indicates: 1) The logical unit is not configured for the port. 2) The cable or terminator is not properly connected. 3) The port is not enabled.
9	STORAGE CLUSTER 1, CHANNEL A–H, ENABLE/REMOTE/DISABLE	3-Way switch	This switch is not used in SCSI or Fibre Channel configurations.
10	STORAGE CLUSTER 2, CHANNEL A–H ENABLE	Green LED	**ON** indicates the cable and terminator are properly connected to the port and the path to the host is ready and enabled. **OFF** indicates: 1) The logical unit is not configured for the port. 2) The cable or terminator is not properly connected. 3) The port is not enabled.
11	STORAGE CLUSTER 2, CHANNEL A–H, ENABLE/REMOTE/DISABLE	3-Way switch	This switch is not used in SCSI or Fibre Channel configurations.
12	STORAGE CLUSTER 1, FORCE OFFLINE	2-Way switch	This switch is not used in SCSI or Fibre Channel configurations.

(continued)

Table 1 Operator Control Panel Indicators and Controls *(continued)*

Item	Name	Description	Function
13	STORAGE CLUSTER 2, FORCE OFFLINE	2-Way switch	This switch is not used in SCSI or Fibre Channel configurations.

Power Switch Panel and Circuit Breakers

The power switch panel is under the control panel. The item numbers in Figure 4 correspond to the item numbers in Table 2.
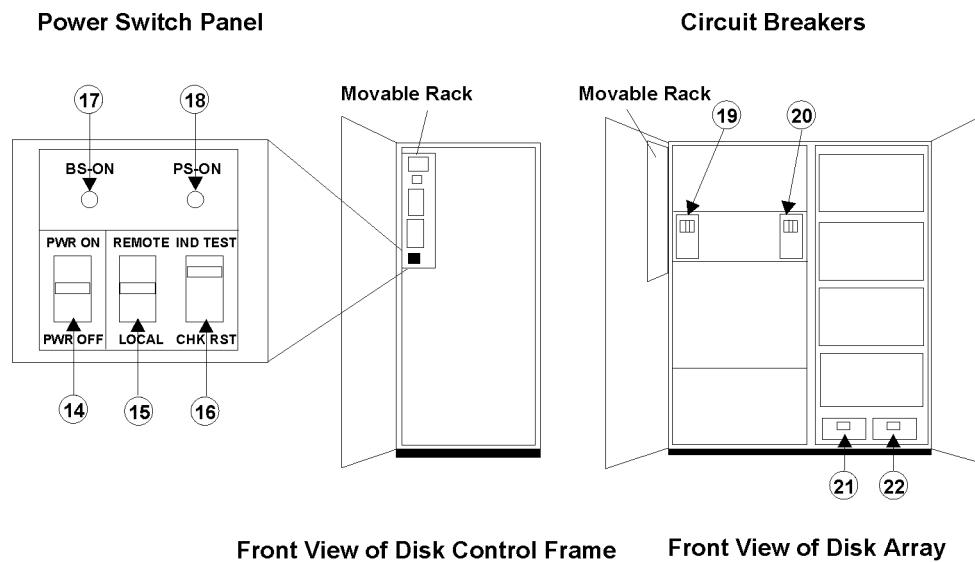
Figure 4   Power Switch Panel

Table 2   Power Switch Panel and Circuit Breakers

Item	Name	Description	Function
14	PWR ON/PWR OFF	Switch	Used to power the disk array on or off. This switch is valid when the REMOTE/LOCAL switch (see item 15) is set to the LOCAL position. Applies to both storage clusters.

Table 2 Power Switch Panel and Circuit Breakers *(continued)*

Item	Name	Description	Function
15	REMOTE/LOCAL	Switch	REMOTE position: Disk array is powered on/off by the instructions from the CPU. LOCAL position: Disk array is powered on/off by the POWER ON/POWER OFF switch. Applies to both storage clusters.
16	IND TEST/CHK RESET	Switch	IND TEST position: The LEDs on Operator Panel and CE Panel go on. CHK RESET position: The PS ALARM and TH ALARM are reset.
17	BS-ON	LED (Amber)	Indicates input power is available.
18	PS-ON	LED (Green)	Indicates the disk array is powered on. Applies to both storage clusters.
19	Disk Control frame Circuit Breaker	Breaker	Turns off AC input power to storage cluster 1.
20	Disk Control frame Circuit Breaker	Breaker	Turns off AC input power to storage cluster 2.
21	Circuit Breaker (MAIN LINE switch 1)	Breaker	Turns off all AC input power.
22	Circuit Breaker (MAIN LINE switch 2)	Breaker	Turns off all AC input power.

Operation

Normal Operation

Except for power-failure recovery, the disk array operates without operator intervention.

The disk array automatically reports all remote service information messages (R-SIMs) to an optional remote console PC (if powered on and booted). This allows the operator to monitor disk array operations.

The Remote Control software allows the operator to view the R-SIMs by date/time or by controller and to manage the R-SIM log file on the remote console PC.

For a description of the content and meaning of the R-SIMs see "Service Information Messages (SIMs)" (page 41).

In addition to monitoring from the remote console PC, the disk array also supports the industry-standard simple network management protocol (SNMP) for remote management from open-system hosts. SNMP is used to transport management information between the remote console PC and the management system, using management tools such as HP OpenView. The SNMP agent sends status information to the host when the host requests it or when a significant event occurs.

HP can also provide a number of software tools to accomplish specialized file management and manipulation tasks. For further information about these products, please contact your HP sales representative.

Powering Down the Disk Array

Situations may arise in the operation of the disk array that require the user to power down the disk array.   These situations include:

- Emergency power-off

- Planned power-off

Emergency Power-Off

An emergency is a critical situation such as a physical plant catastrophe such as a flood, hurricane, tornado, or a threat of injury or death to a person. In an emergency, the critical need is to quickly remove power from the disk array. A quick restart is not necessary.

In an emergency, the operator should trip the Emergency Power-Off (EPO) switch.   The disk array emergency power-off (EPO) switch is located on the control panel.

Note   Use this switch only in case of an emergency. An HP service representative is required to reset the EPO and to power-on the disk array.

To power off the disk array in an emergency:

1.   Open the control panel cover by pushing on the point marked **PUSH**.

2.   Pull the emergency power-off switch (item 7 in Figure 3 on p. 24) up and then out towards you as illustrated on the switch.

3.   Call the HP support center. The EPO switch must be reset by an HP service representative before the disk array can be powered on again.

Planned Power-Off

There may be times when a site power outage is planned. These situations would include alterations to the data center, inspections, or work by the electric company. If a scheduled

power outage affects an HP SureStore E Disk Array XP256, the power down of the disk array must be scheduled with a trained HP support representative.

Note   Only a trained HP representative can shut-down and power-off a disk array. Shutting down and powering off a disk array is *not* a customer activity. A user should not attempt to power down the disk array at any time other than an emergency.

When planning for your planned power outage, please contact your HP CE to schedule a customer visit.

Recovering from a Power Outage to the Disk Array

A power outage to the array is when the primary building power is lost due to electrical blackouts, thunderstorm activity, etc and input AC power is not received by the array. The disk array will maintain its state and recover when power is restored. The array cache is backed up by batteries that will maintain its state for a minimum of 48 hours. This length of time will provide coverage for most outages. In cases where the outage will extend beyond 48 hours, the batteries can be replaced by an HP CE which will extend the time, if necessary.

Note   After power is restored to the customer site and before restoring power to the disk array, HP recommends verification of power by an electrician to ensure all phases are restored and input power to the disk is stable.

The user may opt to call a trained HP representative to recover from the disk array power failure. The user may also use the following procedures for disk array power-failure recovery:

1. Move the REMOTE/LOCAL switch on the front panel (15, Figure 4 on p. 28) to the LOCAL position. The normal position is REMOTE

2. Toggle the PWR ON/OFF switch on the front panel (14, Figure 4 on p. 28) to the PWR ON position.

3. The following LED power sequence will occur:

   a. The BS-ON (17, Figure 4 on p. 28) will turn amber and the PS ON LED (18, Figure 4 on p. 28.) will turn green.

   b. The CHANNEL LED (8, Figure 3 on p. 24) will light green for every adapter installed.

   c. The MESSAGE LED (3, Figure 3 on p. 24) will turn amber signifying a SIM was generated (because the disk array went down unexpectedly).

   d. Finally, the Ready LED (1, Figure 3 on p. 24) will light green signifying the system is ready.

Operation

Note   Powering on the disk array may take upwards of 10 minutes, depending on the number of disks installed in your disk array. Power-on is complete only when the READY LED turns green.

4. Move the REMOTE/LOCAL switch on the front panel (15, Figure 4 on p. 28) to the REMOTE position.

Using Remote Control Software

Disk array Remote Control software runs on a remote console (a PC) and communicates directly with the disk array's SVP through an internal LAN. The remote control software runs under the Windows 95, Windows 98 and Windows NT operating systems, providing a user-friendly interface to the features and functions of the disk array.

Remote Control enables the user to view disk array configuration information and issue commands directly to the disk array. Remote Control provides user access to the standard features of the disk array, such as HP SureStore E LUN Configuration Manager XP or HP SureStore E Cache LUN XP.

The remote control software for the remote console PC does not have access to any user data stored on the disk array.

The remote console PC (PC hardware, operating system, and LAN attachment hardware) can be supplied and installed by the user or ordered from and installed by HP. The specific hardware requirements for the remote console PC (processor speed, storage capacity, and memory) will vary depending on the software to be used and the number of disk arrays to be attached.

For further information on the remote console PC, see the *HP SureStore E Remote Control XP User's Guide*, or contact your HP service representative.

Operation

3   SERVICE INFORMATION

Error Conditions

Service Information Messages (SIMs)

Error Conditions

The disk array provides continuous data availability and is not expected to fail in any way that would prevent access to user data. The READY and ENABLE LEDs on the control panel must be ON when the disk array is operating online.

Table 3 lists potential disk array error conditions and provides instructions for resolving each condition. For error conditions that cannot be resolved, contact your HP service representative.

Table 3   Error Conditions

Error Condition	Recommended Action
Error message displayed on the control panel by the amber Message LED.	Determine the type of error (see the SIM codes in this chapter). If possible, remove the cause of the error. For errors that cannot be resolved, contact your HP service representative.
General power outage.	After power has been restored to the disk array, verify that AC power is stable, and all phases have been restored. Use the process outlined in "Recovering from a Power Outage to the Disk Array" (page 33) to recover from the power outage.
Fence message is displayed on the remote control PC.	Determine if there is a failed storage path. If not, call the HP support center to report the erroneous fence message.

If there is a failed storage path, toggle the RESTART switch and retry the operation. If the fence message is displayed again, call the support center for assistance. If the operation completes successfully (no failed path), the error has been fixed. |
| READY LED does not go on, or there is no power supplied. | Call the HP support center for assistance. WARNING: Do not open the disk array control cabinet or touch any controls inside the control cabinet. |

(continued)

Table 3   Error Conditions *(continued)*

Error Condition	Recommended Action
Pinned track.	A "pinned track" occurs when a disk drive failure temporarily prevents data from being destaged from cache to disk. The next time the data on the pinned track is accessed by the host, the data is destaged to another disk location. The RAID technology and dynamic spare disk drives of the disk array ensure full recovery from disk drive failures and non-stop access to user data. Data can remain pinned in cache if it is not accessed by the host following the pinned track condition. Maintenance activities (for example, microcode updates) require that all pinned tracks be cleared. If an HP service representative encounters pinned tracks during these activities, user assistance can be required to access the data (for example, run DSF Inspect, read and write specific data) to cause it to be destaged to disk.
Emergency: fire, earthquake, flood, etc.	Pull the emergency power-off (EPO) switch. Refer to the process outlined in "Emergency Power-Off" (page 31). Call the HP support center to have the EPO switch reset.
ALARM LED is on.	If there is an ambient temperature problem in the area (see "Specifications", page 51), lower the room temperature and call your HP support representative. If the area temperature is not the obvious cause of the alarm, call the HP support center for assistance.

(continued)

Service Information

Table 3   Error Conditions *(continued)*

Error Condition	Recommended Action
ENABLE LEDs for a cluster do not go on.	Determine if channel I/O operations to that cluster are possible. If so, call the HP support center to have the LEDs checked.
	If I/O operations are not possible, disconnect the channels, and call the HP support center.
	Connectivity and Disconnectivity Parallel Channels Procedure To connect a parallel channel to the disk array: 1. Make sure the disk array is powered on and operating normally. If the Alarm LED and/or Message LED (in Table 3) is on, call the HP support center. 2. Set the ENABLE/DISABLE switch for the channel to be connected to ENABLE, if the ENABLE and READY LEDs for the channel do not go ON, call the HP support center. To disconnect a parallel channel from the disk array: 1. Make sure the disk array is powered on and operating normally. If the Alarm LED and/or Message LED (in Table 3) is on, call the HP support center. 2. Set the ENABLE/DISABLE switch for the channel to be disconnected to DISABLE. If the ENABLE LED for the channel does not go off, call the HP support center.

Service Information Messages (SIMs)

The disk array generates service information messages (SIMs) to identify normal operations, service requirements, and failures. SIMs can be generated by the CHIP (Client Host Interface Processor) and ACP (Array Control Processor) microprocessors and by the internal service processor (SVP).

SIMs are stored on the disk array's SVP for use by HP personnel and logged on the remote console PC as remote SIMs (R-SIMs). The Continuous Track remote maintenance tool also reports SIMs to the HP support center. When a SIM is generated, the amber Message LED on the control panel turns on.

The R-SIM feature of the remote console PC allows the operator to view the R-SIMs reported by the disk array from the remote console PC and from the open-system host. The R-SIM feature uses the simple network management protocol (SNMP) for complete remote disk array management. The remote console PC displays a warning message each time a SIM is reported, even when the remote console software is not running.

Service Information Messages (SIMs) are classified according to severity: service, moderate, serious, or acute. Service-level and moderate-level SIMs do not require immediate attention and are addressed during routine maintenance. Serious-level and acute-level SIMs are reported to the hosts immediately. If a serious or acute SIM is reported, call the HP support center immediately to ensure the problem is addressed as soon as possible.

Figure 5 shows a typical 32-byte SIM from the disk array. SIMs are displayed by reference code (RC) and severity. The six-digit RC, which is composed of bytes 22, 23, and 13, identifies the possible error and determines the severity. The SIM type, located in byte 28, indicates the component which experienced the error.
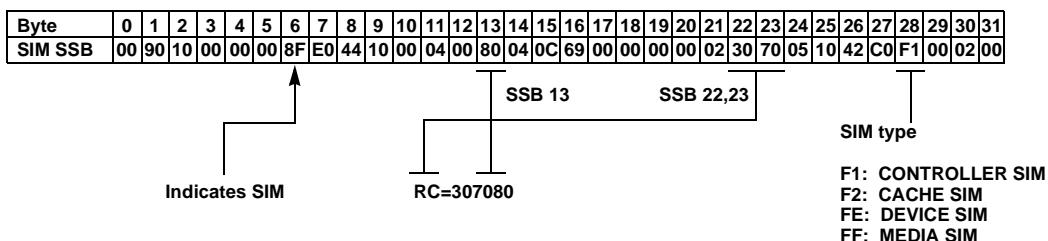
Figure 5   Typical SIM

Table 4 lists and describes the SIM codes reported by the disk array.

Table 4   SIM Codes

Error Type	Error	Ref 22	23	SIM 28	Severity
LCP/MCP error	LCM hardware error	21	3Z	F1	Moderate
	ADP permanent error	21	70	F1	Moderate
	ADP temporary	21	71	F1	Service
	ADP blocking	21	72	F1	Moderate
CHA Processor error	CHK1A threshold over	30	70	F1	Service
	CHK1B threshold over	30	71	F1	Service
	CHK3 threshold over	30	72	F1	Service
	Processor blocking	30	73	F1	Moderate
	FM threshold over	30	74	F1	Service
	FM Error	30	75	F1	Moderate
	LDEV blocked (Effect of processor blocked)	30	90	F1	Serious
	P/S OFF impossible	38	8F	F1	Moderate
	P/S OFF impossible (Device reserved)	38	9F	F1	Moderate
	Undefined package is mounted	39	90	F1	Moderate
	V-R or serial number is inconsistent	39	91	F1	Moderate
	RAID-5 booster is inconsistent	39	92	F1	Serious
	Replace failed	39	93	F1	Moderate
	Micro-program version up	39	94	F1	Serious
	Micro-program version up impossible	39	95	F1	Service

(continued)

Table 4 SIM Codes *(continued)*

Error Type	Error	Ref 22	23	SIM 28	Severity
DKA processor error	CHK1A threshold over	31	70	F1	Service
	CHK1B threshold over	31	71	F1	Service
	CHK3 threshold over	31	72	F1	Service
	Processor blocking	31	73	F1	Moderate
	FM threshold over	31	74	F1	Service
	FM error	31	75	F1	Moderate
	LDEV blocked (effect of processor blocked)	31	90	F1	Serious
	P/S OFF impossible	3C	8F	F1	Moderate
	P/S OFF impossible (device reserved)	3C	9F	F1	Moderate
	Undefined package is mounted	3D	90	F1	Moderate
	V-R or serial number is inconsistent	3D	91	F1	Moderate
	RAID-5 booster is inconsistent	3D	92	F1	Serious
	Replace failed	3D	93	F1	Moderate
	Micro-program version up	3D	94	F1	Service
	Micro-program version up impossible	3D	95	F1	Service
M-bus error	Warning of M bus open (SMC detected)	FF	D0	F1	Moderate
	Bus blocking	FF	EA	F1	Service
	CHK3 threshold over	FF	EB	F1	Service
M-bus error (CHA side)	Warning of M bus open (SMP detected)	FF	D1	F1	Moderate
	Warning of CHK error (SMP detected)	FF	D2	F1	Moderate
	Warning of M bus CHK error (B) (SMP detected)	FF	D4	F1	Moderate
	Warning of M bus DISABLE (SMP detected)	FF	D5	F1	Moderate
	Warning of M bus ABTRST (SMP detected)	FF	D6	F1	Moderate
	Warning of SM DISABLE (SMP detected)	FF	D7	F1	Moderate
	M bus arbiter enable off	FF	D8	F1	Moderate

(continued)

Table 4   SIM Codes *(continued)*

Error Type	Error	Ref 22	23	SIM 28	Severity
M-bus error (DKA side)	Warning of M bus open (SMP detected)	FF	51	F1	Moderate
	Warning of CHK error (SMP detected)	FF	52	F1	Moderate
	Warning of M bus CHK error (B) (SMP detected)	FF	54	F1	Moderate
	Warning of M bus DISABLE (SMP detected)	FF	55	F1	Moderate
	Warning of M bus ABTRST (SMP detected)	FF	56	F1	Moderate
	Warning of SM DISABLE (SMP detected)	FF	57	F1	Moderate
	M bus arbiter enable off	FF	58	F1	Moderate
F-bus error	Bus blocking	FF	FA	F1	Serious
F-bus error (CHA side)	Warning of F bus DISABLE (BSA detected)	FF	80	F1	Moderate
	F-bus arbiter enable off	FF	B1	F1	Moderate
	Warning of F bus open (BSA detected)	FF	FC	F1	Moderate
	Warning of LIVEINS (BSA detected)	FF	FD	F1	Moderate
	Warning of CHK error (BSA detected)	FF	FE	F1	Moderate
F-bus error (DKA side)	Warning of F bus DISABLE (BSA detected)	FF	30	F1	Moderate
	F-bus arbiter enable off	FF	31	F1	Moderate
	Warning of F bus open (BSA detected)	FF	7C	F1	Moderate
	Warning of LIVEINS (BSA detected)	FF	7D	F1	Moderate
	Warning of CHK error (BSA detected)	FF	7E	F1	Moderate
CHA, CHK2 (processor)	RCHA temporary error	3F	84	F1	Service
	RCHA blocking	3F	85	F1	Service
CHS, CHK2 (processor)	SCP path temporary error	3F	86	F1	Service
	SCP path blocked	3F	87	F1	Service

(continued)

Table 4 SIM Codes *(continued)*

Error Type	Error	Ref 22	23	SIM 28	Severity
DKA, CHK2 (processor)	Pinned slot	CF	4X	F1	Moderate
	DRR temporary error	CF	80	F1	Service
	SCA temporary error (0-3)	CF	81	F1	Service
	DRR blocking	CF	82	F1	Moderate
	SCA blocking (0-3)	CF	83	F1	Moderate
	SCSI port blocking (effect of PATH INLINE failed)	CF	84	F1	Moderate
	LDEV blocked (effect of SCA blocked)	CF	90	F1	Serious
Cache data error	Pinned slot	FF	4X	F2	Moderate
Cache error (Side A/B)	Coexistence of cache SIMM sizes	FF	CC	F2	Service
	Area is in violation	FF	CD	F2	Service
	Package is in violation	FF	CE	F2	Service
	Module group is in violation	FF	CF	F2	Service
	Correctable error: 1-bit error	FF	F0	F2	Service
	Correctable error: 2-bit error	FF	F8	F2	Service
	Uncorrectable error	FF	F1	F2	Service
	Module group blocking	FF	F2	F2	Moderate
	Package blocking	FF	F3	F2	Moderate
	Area blocking	FF	F4	F2	Serious
	Both area failed	FF	F5	F2	Moderate

(continued)

Table 4   SIM Codes *(continued)*

Error Type	Error	Ref 22	23	SIM 28	Severity
Shared memory error (Side A/B)	Loss of duplicated information	FF	DE	F1	Service
	One side area is volatiled	FF	DF	F1	Service
	Correctable error	FF	E0	F1	Service
	Uncorrectable error	FF	E1	F1	Service
	Area blocking	FF	E2	F1	Serious
	Real memory size inconsistent	FF	E3	F1	Serious
	Replace failed	FF	E4	F1	Serious
	Both side invalid	FF	E5	F1	Acute
	Configuration information compare error	FF	E6	F1	Acute
	Shared memory is in violation	FF	E7	F1	Serious
	Configuration unmatch	FF	E8	F1	Acute
	CHK3 threshold over	FF	EC	F1	Serious
	Area temporary blocking	FF	EE	F1	Service
	Rebooted without volatilization after an instantaneous down	FF	EF	F1	Service

Table 4 SIM Codes *(continued)*

Error Type	Error	Ref 22	23	SIM 28	Severity
Drive error (normal R/W)	SCSI temporary error	DF	7Y	FE	Service
	Drive temporary error	EF	1A	FF	Service
	Drive media error	43	40	FE	Service
	SCSI blocked	DF	8Y	FE	Moderate
	LDEV blocked (effect of SCSI blocked)	DF	9Y	FE	Serious
	Drive blocked (drive)	EF	10	FE	Serious
	Drive blockade (effect of dynamic sparing normal end)	EF	11	FE	Service
	LDEV blocked (effect of drive blocked)	EF	90	FE	Serious
	Drive blocked (media)	43	E0	FE	Serious
	Correction copy start	45	10	FE	Service
	Correction copy normal end	45	20	FE	Service
	Correction copy abnormal end	45	21	FE	Serious
	Correction copy discontinued	45	22	FE	Serious
	Correction copy warning end (with blocked LDEV or some error)	45	24	FE	Serious
	Dynamic sparing start (drive copy)	46	10	FE	Service
	Dynamic sparing normal end (drive copy)	46	20	FE	Service
	Dynamic sparing abnormal end (drive copy)	46	21	FE	Moderate
	Dynamic sparing discontinued	46	22	FE	Service
	Dynamic sparing warning end (with blocked LDEV or some error) (drive copy)	46	24	FE	Service
	Pinned slot	EF	4X	FE	Moderate
	LDEV read only	EF	3X	FE	Serious
Drive error (ORM)	SCSI temporary error	50	DY	FE	Service
	Drive temporary error	50	10	FE	Service
	Drive media error	50	20	FF	Service

Service Information

Table 4   SIM Codes *(continued)*

Error Type	Error	Ref 22	23	SIM 28	Severity
SVP interface error	Ethernet error for SVP (CHA side)	14	00	F1	Moderate
	SIM transfer failure to SVP (CHA side)	14	01	F1	Serious
	Ethernet error for SVP (DKA side)	15	00	F1	Moderate
	SIM transfer failure to SVP (DKA side)	15	01	F1	Serious
Power error	HDU power off	AC	50	F1	Service
	HDU power recovered	AC	51	F1	Service
Environmental error	Temperature alert	BF	1X	F1	Moderate
	Voltage alarm	BF	2X	F1	Moderate
	Voltage warning	BF	3X	F1	Moderate
	P/S warning	BF	4X	F1	Moderate
	Battery warning	BF	5X	F1	Moderate
	AC warning	BF	6X	F1	Moderate
	Fan abnormality: CL1 logic	BF	7X	F1	Moderate
	Fan abnormality: CL2 logic	BF	7X	F1	Moderate
	Fan abnormality: HDU-R1X	BF	7X	F1	Moderate
	Fan abnormality: HDU-L1X	BF	7X	F1	Moderate
	Fan abnormality: HDU-R2X	BF	7X	F1	Moderate
	Fan abnormality: HDU-L2X	BF	7X	F1	Moderate
	JP remains	BF	8X	F1	Moderate
	Environment monitor error	BF	9X	F1	Moderate
	Environment monitor warning	BF	AX	F1	Moderate
	SVP P/S abnormal	BF	C0	F1	Moderate

(continued)

Table 4 SIM Codes *(continued)*

Error Type	Error	Ref 22	23	SIM 28	Severity
SVP error	Logical inconsistency	70	XX	F1	Moderate
	HEAP error	71	XX	F1	Moderate
	File error	72	XX	F1	Moderate
	LAN error	73	XX	F1	Moderate
	S-SVP error	74	XX	F1	Moderate
	Windows error	75	XX	F1	Moderate
	CUDG3 detected error	76	01	F1	Moderate
	LDCG3 detected error	76	01	F1	Moderate
	BOOT detected error (CHA)	79	00	F1	Moderate
	BOOT detected error (DKA)	79	01	F1	Moderate
End status of remote microprogram exchange	Normal end	7A	00	F1	Service
	Abnormal end (SVP)	7A	01	F1	Service
	Abnormal end (MP)	7A	02	F1	Service
	Version check error	7A	03	F1	Service
	Sum check error	7A	04	F1	Service
	LCP patch error	7A	05	F1	Service
	Warning (configuration inconsistency)	7A	10	F1	Service
	Warning (S-SVP busy)	7A	11	F1	Service
	Warning (LCP Busy)	7A	12	F1	Service
Dump received	WCHK1 dump (CHA)	30	80	F1	Moderate
	ABEND dump (CHA)	30	81	F1	Moderate
	WCHK1 dump (DKA)	31	80	F1	Moderate
	ABEND dump (DKA)	31	81	F1	Moderate

(continued)

Table 4   SIM Codes *(continued)*

Error Type	Error	Ref 22	23	SIM 28	Severity
Backup server	Backup server failure detected by SVP	BE	00	F1	Moderate
	ATL failure	BE	01	F1	Moderate
	MT failure	BE	02	F1	Moderate
	OS failure	BE	03	F1	Moderate
	NetWorker error	BE	04	F1	Moderate
	Application error	BE	05	F1	Moderate

4   SPECIFICATIONS

Environmental Specifications

Power Requirements

Host Connectivity

Environmental Specifications

Environmental specifications are shown in the table below.

Item	Condition		
	Operating	**Nonoperating**	**Shipping and Storage**
Temperature (°C)	16 to 32	-10 to 43	-25 to 60
Relative Humidity (%)	20 to 80	8 to 90	5 to 95
Max. Wet Bulb (°C)	26	27	29
Temperature Deviation (°C/hour)	10	10	20
Vibration	0.25mm, 5–10Hz 0.05G, 10–300Hz	2.5mm, 5–10Hz 0.5G, 10–70Hz 0.05mm, 70–99Hz 1.0G, 99–300Hz	0.5G, 15min. At four most severe resonance between 5–200Hz
Shock	Horizontal: Vertical:	Incline Impact 1.22m/s Rotational Edge 0.1m	

Power Requirements

Input Voltage

- 208V or 230V AC -8%, at 60Hz ±0.5Hz, 3-phase (3 wire + ground)

- 220V, 230V or 240V AC -8%, at 50Hz ±0.5Hz, 3-phase (3 wire + ground)

- 380V, 400V or 415V AC -8%, at 50Hz ±0.5Hz, 3-phase (4 wire + ground)

Distribution board with circuit breaker or equivalent is rated at 30A for Disk Drive Unit.

AC power cable plug (60Hz)

FS3760 PDG/1100 (RUSSEL & STOLL) or equivalent

AC power receptacle (60Hz)

3754 (RUSSEL & STOLL) or equivalent

Host Connectivity

Interface Type	Fibre Channel	SCSI Fast-Wide SCSI Ultra SCSI
Number of ports per Interface Card	2	4
Number of ports per Disk Control Frame	min.: 4 max.: 16	min.: 8 max.: 32
FC-AL Hub Support	Yes	–
Maximum number of SCSI IDs per channel port	–	15
Maximum number of LUs per channel port	120	64/32

5   REGULATORY STATEMENTS

FCC EMC Statement (USA)

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense. The end user of this product should be aware that any changes or modifications made to this equipment without the approval of Hewlett-Packard could result in the product not meeting the Class A limits, in which case the FCC could void the user's authority to operate the equipment.

Hewlett-Packard's device certification tests were conducted with HP computer systems and HP shielded cables, such as those you received with your product. Changes or modifications not expressly approved by Hewlett-Packard could void the user's authority to operate the equipment. Cables used with this device must be properly shielded to comply with the requirements of the FCC.

IEC Statement (Worldwide)

This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

EMC Statement (Canada)

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la Classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Regulatory Statements

Spécification ATI Classe A (France)

DECLARATION D'INSTALLATION ET DE MISE EN EXPLOITATION d'un matériel de traitement de l'information (ATI), classé A en fonction des niveaux de perturbations radioélectriques émis, définis dans la norme européenne EN 55022 concernant la Compatibilité Electromagnétique.

VCCI EMC Statement (Japan)

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

BSMI EMC License Number and Statement (Taiwan)

警告使用者：這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

檢磁 3882H453

Harmonics Conformance (Japan)

高調波ガイドライン適合品

German Noise Declaration

Schalldruckpegel Lp = 62 dB(A)
Am Arbeitsplatz (operator position)
Normaler Betrieb (normal operation)
Nach ISO 7779:1988 / EN 27779:1991 (Typprüfung)

Laser Safety

When equipped with native Fibre Channel adapters, this product contains a laser internal to the Optical Link Module (OLM) contained on the 4-port Fibre Channel Adapter board for connection to a Fibre communications network.

In the USA, the OLM is certified as a Class 1 laser product conforming to the requirements contained in the Department of Health and Human Services (DHHS) regulation 21 CFR, Subchapter J. The certification is indicated by a label on the plastic OLM housing. Outside the USA, the OLM is certified as a Class 1 laser product conforming to the requirements contained in IEC 825-1:1993 and EN 60825-1:1994, including Amendment 11:1996.

The following figure shows the Class 1 information label that appears on the plastic housing of the OLM.

CLASS 1 LASER PRODUCT

Complies with
21 CFR 1040.10 and 1040.11
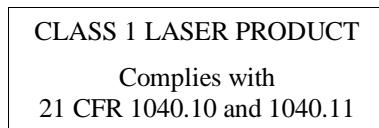
Each communications port consists of a transmitter and receiver optical subassembly. The transmitter subassembly contains internally a semiconductor laser diode in the wavelength range of 770 to 850 nanometers. In the event of a break anywhere in the fibre path, the OLM control system prevents laser emissions from exceeding Class 1 levels. Class 1 laser products are not considered hazardous.

WARNING   **There are no user maintenance operations, service operations or adjustments to be performed on the Optical Link Module.**

DECLARATION OF CONFORMITY	
according to ISO/IEC Guide 22 and EN 45014	
Manufacturer's Name:	Hewlett-Packard Company
	Enterprise Storage Business Unit
Manufacturer's Address:	8000 Foothills Blvd.
	Roseville, CA 95747
	USA
declares, that the product	
Product Name:	SureStore E Disk Array 256 XP
Model Number(s):	A5701A, A5709A
Product Options:	All

conforms to the following Product Specifications:

Safety: IEC 950:1991 + A1, A2, A3, A4 / EN 60950:1992 + A1, A2, A3, A4
  GB 4943-1995
  IEC 825-1:1993 / EN 60825-1:1994 + A11, Class 1

EMC: CISPR 22:1993 +A1, A2 / EN 55022:1994 +A1, A2 - Class A[1]
  GB 9254-1988
  EN 50082-2:1995
    IEC 61000-4-2:1995 / EN 61000-4-2:1995,   Level 2 CD, Level 3 AD
    IEC 61000-4-4:1995 / EN 61000-4-4:1995,   Signal Lines: Level 4
                          Power Lines: Level 3
    IEC 61000-4-8:1993 / EN 61000-4-8:1993, Level 4
    ENV 50140:1993, Level 3
    ENV 50141:1993, Level 3
    ENV 50204:1995, Level 3
   IEC 61000-3-2:1995 / EN 61000-3-2:1995, Class A
    IEC 61000-3-3:1994 / EN 61000-3-3:1995

Supplementary Information:

The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC and carries the CE marking accordingly.

1) The Product was tested in a typical configuration with an HP 9000 K-Class computer system and an HP A5707A SCSI Bridge.

Roseville, April 4, 1999

Martin D. King, Quality & Customer Care Mgr.

European Contact: Your local Hewlett-Packard Sales and Service Office or Hewlett-Packard GmbH, Department HQ-TRE, Herrenberger Straße 130, D-71034 Böblingen (FAX: + 49-7031-14-3143)

ACRONYMS AND ABBREVIATIONS

ACP	array control processor
AL	arbitrated loop
BC	Business Copy software
BS	basic supply
BTU	British thermal unit
°C	degrees centigrade/Celsius
CA	Continuous Access software
ca	cache
CE	Customer Engineer
CFW	cache fast write
CH	channel
CHP	channel processor or channel path
CHIP	client-host interface processor
CHPID	channel path identifier
CKD	count key data
CL	cluster
CPU	central processing unit
CSA	Canadian Standards Association

CT	Continuous Track maintenance support application
CU	control unit
CVS	custom volume size (also called Virtual LVI)
DASD	direct access storage device
DCR	dynamic cache residency (also called Cache LUN XP)
DE	Data Exchange software
DFDSS	Data Facility Dataset Services
DFSMS	Data Facility System Managed Storage
DFW	DASD fast write
dr	drive
DSF	Device Support Facilities
DW	duplex write
DWL	duplex write line
ECKD	Extended Count Key Data
EOF	end of field
EPO	emergency power-off
EREP	Error Reporting
ESA	Enterprise Systems Architecture
ESCON	Enterprise System Connection (IBM trademark for optical channels)
ExSA	Extended Serial Adapter
FAL	File Access Library (part of the Data Exchange software)

FBA	fixed-block architecture
FC	Fibre Channel
FC-AL	Fibre Channel Arbitrated Loop
FCC	Federal Communications Commission
FCU	File Conversion Utility (part of the Data Exchange software)
FDR	Fast Dump/Restore
ft.	foot/feet
F/M	format/message
FBA	fixed-block architecture
FWD	fast wide differential
GB	gigabytes
GLM	gigabyte link module
GUI	graphical user interface
HCD	hardware configuration definition
HP	Hewlett-Packard Company
H/W	hardware
Hz	Hertz
ICKDSF	A DSF command used to perform media maintenance
IDCAMS	access method services (a component of Data Facility Product)
IML	initial microprogram load
in.	inches

I/O	input/output (operation or device)
IOCP	input/output configuration program
JCL	job control language
KB	kilobyte
kcal	kilocalorie
kg	kilogram
km	kilometer
kVA	kilovolt-ampere
kW	kilowatt
LAN	local area network
lb	pound
LD	logical device
LDEV	logical device
LED	light emitting diode
LPAR	logical partition
LCP	link control processor, local control port
LRU	least recently used
LUN	logical unit, logical unit number
LUSE	logical unit size expansion
LVI	logical volume image
LVM	Logical Volume Manager

m	meters
MB	megabytes
mm	millimeters
MP	microprocessor
MPLF	Multi-Path Locking Facility
MR	magnetoresistive
ms, msec	milliseconds
MVS	Multiple Virtual Storage (including MVS/370, MVS/ESA, MVS/XA)
NVS	nonvolatile storage
OEM	original equipment manufacturer
OFC	open fibre control
OLM	optical link module
ORM	online read margin
OS	operating system
P/DAS	PPRC/dynamic address switching
PC	personal computer
PCI	power control interface
PM	Performance Manager software
P-P	point-to-point
PPRC	Peer-to-Peer Remote Copy
PS	power supply

R&S	RUSSEL & STOLL
RAID	redundant array of independent disks
RAM	random access memory
RC	reference code
RC	Remote Control software
RISC	reduced instruction set computer
R-SIM	remote service information message
R/W	read/write
S/390	IBM System/390 architecture
SAM	System Administration Manager
SCSI	small computer system interface
sec.	second
seq.	sequential
SIM	service information message
SMS	System Managed Storage
SNMP	simple network management protocol
SSID	storage subsystem identification
SVP	service processor
TB	terabyte
TID	target ID
TPF	Transaction Processing Facility

TSO	Time Sharing Option (an IBM System/370 operating system option)
UCB	unit control block
UL	Underwriters' Laboratories
VDE	Verband Deutscher Elektrotechniker
VM	Virtual Machine (an IBM S/390 system control program)
VOLID	volume ID
volser	volume serial number
XRC	Extended Remote Copy
VSE	Virtual Storage Extension (an IBM S/390 operating system)
VTOC	volume table of contents
XA	System/370 Extended Architecture
XDF	Extended Distance Feature (for ExSA channels)

Acronyms

INDEX

Index

Reader Comment Sheet

HP SureStore E Disk Array XP256
Familiarization Guide

We welcome your evaluation of this manual. Your comments and suggestions will help us improve our publications. Remove this page and mail or FAX it to 916-785-2299. Use and attach additional pages if necessary.

	Agree				Disagree	N/A
The manual is well organized.	◯	◯	◯	◯	◯	◯
The information is technically accurate.	◯	◯	◯	◯	◯	◯
Information is easy to find.	◯	◯	◯	◯	◯	◯
Step-by-step procedures are easy to perform.	◯	◯	◯	◯	◯	◯
There are enough examples and pictures.	◯	◯	◯	◯	◯	◯
The examples and pictures are useful.	◯	◯	◯	◯	◯	◯

Comments _____

_____

_____

_____

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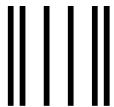
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A5701-90900 E0700

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